UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF

(SR-6J)

May 22, 2002

Mr. Steven D. Smith
Solutia, Inc.
P.O. Box 66760
St. Louis, Missouri 63166-6760

RE: Groundwater Focused Feasibility Study
Sauget Area 2 Site - St. Clair County, Illinois

Dear Mr. Smith:

Pursuant to the November 24, 2000, Administrative Order on Consent for the Sauget Area 2 Site, the United States Environmental Protection Agency (U.S. EPA) requested a focused feasibility study (FFS) be submitted to address the known groundwater contamination problem in the vicinity of Site R. Solutia submitted a draft groundwater FFS on December 21, 2001. U.S. EPA provided a comment letter on February 20, 2002, and a revised FFS was submitted by Solutia on March 31, 2002.

The U.S. EPA and the Illinois Environmental Protection Agency (Illinois EPA) have completed their reviews of the revised Area 2 groundwater FFS. Comments on the Area 2 FFS are provided in the enclosures to this letter. All enclosures have previously been provided to Solutia for discussion purposes.

Enclosure 1 contains comments on the FFS from U.S. EPA's Technical Assistance and Technology Transfer Branch. Based on preliminary discussions with Solutia, U.S. EPA believes all of these comments will be adequately addressed in the final FFS. As part of Solutia's response, it is U.S. EPA's understanding that two additional water-level piezometer

clusters will be installed between the pumping wells and some of the monitoring well clusters will be relocated as shown in Enclosure 4. Solutia has also committed to continue screening for DNAPLs during the installation of the proposed extraction and monitoring wells/piezometers.

Enclosures 2 contains comments from U.S. EPA's contractor CH2MHILL. One of the issues raised was whether to measure fish tissue or sediment toxicity. There appears to be several inconsistencies between the ecological risks identified in Section 1.2.8 of the FFS and the proposed bioaccumulation monitoring program in Section 5.2. Based on discussions with Solutia, the bioaccumulation monitoring program will be replaced with a toxicity monitoring program. For purposes of the FFS, Solutia should provide an overview of the toxicity monitoring program based on the recommendations provided in Enclosure 5.

Enclosure 3 contains Illinois EPA's comments. Illinois EPA comments on Section 2.7-Treatability Studies and 2.8-Local Limits Evaluation highlights the uncertainty that remains regarding the feasibility of discharging extracted groundwater to the Village of Sauget PChem plant for pretreatment and then to the American Bottoms Regional Treatment Facility. Illinois EPA raised several questions including whether American Bottoms treatment process will be inhibited by the groundwater discharge, whether American Bottoms will have pass-through, and whether the Sauget P Chem plant is appropriate treatment technology and treatment capacity to pretreat the groundwater discharge. Given the extent of Illinois EPA's comments, it is obvious that much work needs to be done before a decision can be made regarding the appropriate approach for managing the extracted groundwater. However, U.S. EPA does not believe the FFS is the appropriate avenue to fully address these concerns. Solutia is currently in the process of applying for a discharge permit from American Bottoms. These concerns should be adequately addressed through the permitting process or alternative treatment options may need to be evaluated. For purposes of responding to these comments, please provide any additional information available at this time and an update regarding the status of the discharge permit application including a summary of ongoing discussions with American Bottoms and any information under development by either Solutia or American

Bottoms. It is critical that U.S. EPA and Illinois EPA are kept informed regarding the ongoing discussions with American Bottoms.

Please address the comments in the enclosures, and resubmit the revised groundwater FFS for approval by June 5, 2002. If you have any questions regarding this letter or the enclosures, please feel free to call me at (312) 886-4592.

Sincerely,

Mike Ribordy
Remedial Project Manager
Superfund Division

Enclosures

cc: Sandra Bron, IEPA, w/enclosures
Peter Barrett, CH2M HILL, w/enclosures
Kevin de la Bruere, USFWS, w/enclosures
Michael Henry, IDNR, w/enclosures

bcc: Thomas Martin, USEPA, w/enclosures
Ken Bardo, USEPA, w/enclosures
Record Center
Bruce Sypniewski, U.S. EPA

ENCLOSURE 1

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
NATIONAL RISK MANAGEMENT RESEARCH LABORATORY
SUBSURFACE PROTECTION AND REMEDIATION DIVISION
P.O. BOX 1198 • ADA, OK 74820

May 1, 2002

OFFICE OF
RESEARCH AND DEVELOPMENT

MEMORANDUM

SUBJECT: Sauget Area 2 Superfund Site, Sauget, IL (02-R05-001)
Focused Feasibility Study

FROM: Steven D. Acree, Hydrogeologist
Technical Assistance and Technology Transfer Branch

TO: Mike Ribordy, RPM
U.S. EPA, Region 5

Per your request for technical assistance, the referenced document has been reviewed by Dr. Hai Shen and Mark Paddack of Dynamac Corporation and me. Dynamac Corporation is an off-site contractor providing technical support services to this laboratory. In general, the effectiveness of hydraulic capture and the ability to monitor remedy performance will be enhanced through incorporation of the physical barrier proposed in Alternative B. Detailed comments and recommendations for improvement of Alternative B, mainly in the area of performance monitoring, are provided below for your consideration.

1. The proposed system will operate with no net difference in hydraulic heads across the wall as measured at two locations. It is noted that a significant flux of ground water and, potentially, dissolved contaminants may occur under relatively low hydraulic gradients in this setting due to the high transmissivity in the middle and deep hydrologic units. Therefore, increased performance monitoring, in comparison to more traditional systems that maintain measurable hydraulic gradients toward the pumping wells, appears to be warranted. To this end, the following changes in the monitoring system are proposed to increase confidence in the evaluations of system performance.

A. Currently, ground-water elevations are only measured along the line of extraction wells parallel to the river. It is suggested that additional piezometers screened within each hydrologic unit and located in transects perpendicular to the river near the middle and upgradient limit of the physical barrier be installed. Ground-water elevations from these locations would be used to better define the effects of the containment system on the ground-water flow field in each unit and insure that mounding does not occur, resulting in any significant flow out of the containment cell. Locations along the northern and southern segments of the wall would minimize drilling through landfill materials. It is also noted that several existing wells are located within and near the containment cell. It is recommended that ground-water elevations be monitored in these wells as part of the performance monitoring program. It is also recommended that the

piezometers to be used for performance monitoring be installed during the initial phase of the project and monitored to provide information on ambient conditions prior to and during system installation.

B. With respect to the monitoring of contaminant concentration trends outside the wall, it is recommended that monitoring well clusters be installed north and south of the upgradient portions of the northern and southern wall segments, respectively. Observation of temporal trends in contaminant concentrations in these areas will help assure that ground water from within the cell is not escaping due to mounding. It is also recommended that the spacing between well clusters positioned downgradient of the wall be decreased. An appropriate and practicable spacing may be approximately half of the current spacing. This will aid in identifying significant areas of weakness in the wall and allow a more detailed evaluation of system performance in this critical area. This enhanced network will be most useful during the early phases of performance monitoring. However, once the performance of the system is documented, reduction in the monitoring frequency of many of these wells should be warranted.

2. Data indicate that dense nonaqueous phase liquids may be present in the middle and deep hydrogeologic units beneath the site. The distribution of these materials may impact the effectiveness of the system. If significant lateral migration of DNAPL toward the river has occurred within any of the hydrogeologic units, this source material may be present beyond the proposed trace of the physical barrier. It is recommended that soil samples be obtained during the installation of the proposed extraction and monitoring wells/piezometers and the determination of soil properties discussed in the preliminary barrier wall design. These samples may then be screened for possible indications of NAPL, as discussed in previous correspondence and in Table 5 of the Fact Sheet entitled "DNAPL Site Characterization", EPA/540/F-940/049. It is also suggested that all existing wells located downgradient of Site R be monitored for accumulations of NAPL to refine the conceptual model for NAPL distribution in this area.

3. It is recommended that the current ground-water flow model be refined to incorporate the remediation system and that monitoring data be compared with expected results. Modeling analysis and independent evaluation of field monitoring data should allow a better analysis of flow patterns following installation of the physical barrier. The model should also serve as a tool for refinement of the extraction system design and incorporation of other aspects of the final remedy for this site.

If you have any questions concerning this review, please do not hesitate to call me at your convenience (580-436-8609). We look forward to future interactions with you concerning this and other sites.

cc: Rich Steimle (5102G)
Larry Zaragoza (5204G)
Luanne Vanderpool, Region 5
Doug Yeskis, Region 5

ENCLOSURE 2

Sauget Focused Feasibility Study Review

PREPARED FOR: Mike Ribordy/USEPA
PREPARED BY: CH2MHILL
COPIES: Bob Root/CH2M HILL
Mike Kangas/CH2M HILL
Ning Li/CH2M HILL

DATE: May 2, 2002

This technical memorandum has been prepared at the request of Mike Ribordy, Remedial Project Manager, U.S. Environmental Protection Agency (EPA), Region V. The subject of the memorandum is a revised Focused Feasibility Study (FFS) for the Sauget Area 2 (SA2) site. The FFS is dated April 1, 2002 and was prepared by Solutia Inc. The goal of the FFS is to identify and evaluate appropriate interim response actions to address the contaminated groundwater that is discharging from SA2 sites to the adjacent Mississippi River.

General Comments

The revised document is more complete, and in particular provides the necessary technical supporting information to explain and justify the assumptions made to model the groundwater flow regime and predict required groundwater extraction rates. The following comments are made in an effort to improve the outcome of the FFS and the consequent success of the chosen response action.

- The FFS states that the groundwater pumping rates will be adjusted according to the river stage. It is possible, though, that for the U-shaped barrier, there will be a lag between changes in river stage and the movement of groundwater into or out of the barrier because of the distance groundwater will have to flow. Therefore, there may be a need to time any changes in pumping rate with actual changes in water levels within the barrier, besides considering those in the river.

  For example, as the river level drops, the pumping rate increase to account for the greater hydraulic gradient. If the effect of this increased pumping rate is greater than that of the decline of the water level outside of the barrier due to the river falling, then there will be an increased gradient across the barrier for as long as this difference lasts. A similar effect could occur as the river level goes up. It is difficult to judge whether or not this increased gradient would have a significant effect on the integrity of the grout barrier but it may be prudent to evaluate potential impacts because, over many cycles, there may be a cumulative effect of the variable stresses that could eventually compromise the barrier's integrity. Such an evaluation should be considered during initial set-up, calibration, and operation of the system to see if the time-lag phenomenon is significant, and, if so, to see if there is a way to minimize the effect.

- It would be useful if the authors could provide some examples or case histories of successful jet grouting projects, including identifying experienced contractors. There is still a considerable amount of uncertainty regarding the efficacy of jet grouting to depths of 140 feet; therefore, some real-world examples would be beneficial for all concerned. The approach is described in the FFS as "demonstrated", and there are some references to demonstration projects, but a summary of how well they have operated in the past and any information on problems that may have been encountered should be included in the report.

- It is recommended that groundwater discharge rates be measured by including totalizers on each of the extraction wells. It is important to quantify the individual differences in pumping rates in groups of wells and monitoring discharge with only instantaneous measurements is not likely to provide reliably accurate results.

Specific Comments

- Vol. 1, Section 2.1.3.3 – the three hydrologic units, shallow, middle, and deep are described here as 30 feet thick, 40 feet thick, and 30-40 feet thick, respectively. However, in Section 5-2, p. 5-8, the thicknesses are stated as 40 feet, 50 feet, and 50 feet. Furthermore, in Volume 2, Design Basis, the relative depths of these units for modeling purposes are given as "from the water table to 380 ft. MSL" – or about 20 feet thick; from 380 ft. MSL to 350 ft. MSL (30 feet thick); and from 350 ft. MSL to bedrock at 290 ft. MSL (40 feet thick). It is recommended that a consistent thickness, or range of thickness, be used to describe the three identified hydrologic units.

- Vol. 1, Section 5.2, *Physical Barrier* – the design depths of the partially penetrating wells should be stated and justified in the text. It is recommended that a design schematic for the extraction wells be provided.

- Vol. 1, Section 5.2, *Groundwater Quality Monitoring* – it is stated that, "mass loading will be determined for each hydrogeologic unit" and that, "total mass loading to the Mississippi River will be determined". However, the relative depths of the three hydrogeologic units used for the mass loading calculations are not consistent with those used for the modeling. It is recommended that this discrepancy be explained or eliminated.

- Vol. 1, Section 5.2, *Bioaccumulation Monitoring* - Section 5.2 explains that the proposed bioaccumulation monitoring program will be used to determine trends in fish tissue concentrations relative to baseline 2000 fish tissue monitoring data. The initial set of fish samples will yield a very simple trend line that will indicate only whether or not fish tissue concentrations have increased or decreased. It is important that the statistical procedures for characterizing the difference be specified, and that at least five fish be collected for each composite. The relative small number of composite fish samples means that the power to detect a change in fish tissue concentration will be relatively low. The rationale for the number of fish samples should be specified in terms of a DQO process. Appropriate test hypotheses and statistical methods should be specified to support the decision that is to be made with the proposed data.

- Vol. 1, Section 5.2, *Bioaccumulation Monitoring* - An effort should be made to collect the same species and size distribution of fish that were caught in 2000. Carp and catfish are the preferred species. The samples should be taken at approximately the same time of year, preferably under low flow conditions.

- Vol. 1, Section 5.2, *Bioaccumulation Monitoring* - There is no information provided on the method that will be used to determine the impact of chemical concentrations in the plume on bioaccumulation versus bioaccumulation from an upstream source. It might be useful to have fish samples from a location upstream of the plume that would represent background bioaccumulation levels. This would allow a determination that bioaccumulation is related to plume discharges and not uptake of a chemical from water that is contaminated by an upstream source. This is an important consideration if fish that are caught have recently migrated into the plume prior to sampling and do not reflect steady-state bioaccumulation of chemicals present in the plume.

- Vol. 1, Section 5.2, *Bioaccumulation Monitoring* - The use of stomach content analysis data is not defined. It would be useful to have additional information provided on how the stomach content analysis data will be used other than to document food sources. Also, if the species of fish that were caught in the 2000 sampling program are caught in the proposed bioaccumulation monitoring program, it is not apparent why these additional data are necessary.

- Vol. 1, Section 5.2, *Bioaccumulation Monitoring* - The site specific sampling plan for the bioaccumulation monitoring program should be reviewed to determine if the above sampling and data analysis requirements are being addressed.

- Vol. 1, Section 5.3 – the third monitoring scheme, Bioaccumulation Monitoring, is not included in the section and should be added, consistent with earlier Section 5.2.

- Vol. 2, Design Basis, *Figure 1* - the purpose of the "Discharge Control Wells" shown on Figure 1 is unclear. The detail is likely a holdover from a previous version of this figure and doesn't seem to apply to the FFS unless the hydraulic barrier is being offered as the preferred response action.

- Vol. 2, *Pumping System* – the specifications appear to require updating to account for the new extraction well design (e.g., 12-inch diameter wells are specified in Vol.1, Table 5-1 but 10-inch diameter wells are stated on p. 1 of the pumping system specifications provided in Vol. 2).

"Barrett, Peter/STL" <pbarrett@CH2M.com>
04/25/2002 04:36 PM

To: Mike Ribordy/R5/USEPA/US@EPA
cc: "Kangas, Mike/CLE" <MKangas@CH2M.com>
Subject: FW: Additional comments on the FFS

Mike - Mike Kangas has been thinking again, and feels like the points below need to be resolved. In a nutshell, and based in part on information shared during yesterday's teleconference, it seems that the rationale for monitoring bioaccumulation versus sediment toxicity is not well justified or consistently followed.

Perhaps Jim Chapman and Mike K. should talk this through (since my geology background has not prepared me for such arcane detail....).

Regards - Peter.

> -----Original Message-----
> From: Kangas, Mike/CLE
> Sent: April 25, 2002 4:27 PM
> To: Barrett, Peter/STL
> Subject: Additional comments on the FFS
>
> Peter:
>
> There appear to be some inconsistencies between the ecological risks
> identified in Section 1.2.8 of the FFS and the proposed bioaccumulation
> monitoring program Section 5.2. I thought it might be good to discuss
> these apparent inconsistencies now than later.
>
> 1. Section 1.2.8 indicates that the Menzie Cura ERA identified: 1)
> sediments as toxic to fish, and 2) surface water near sediments are toxic
> to aquatic invertebrates that serve as prey for fish. It is not clear why
> a sediment toxicity monitoring program is not proposed in Section 5.2.
>
> 2. Section 1.2.8 indicates that only one chemical, MCPP [Methyl
> Chlorophenoxy Propionic Acid, is accumulating in fish exposed to sediment.
> There is not adverse effect or risk identified to be associated with the
> bioaccumulation of this compound. There is no rationale for selection of
> bioaccumulation monitoring over sediment toxicity monitoring. Section
> 1.2.8 states that water column invertebrates, not sediment-dwelling
> invertebrates are important prey for fish in the area. If benthic
> invertebrates are not important food items, how is MCPP accumulating from
> sediment to "bottom-feeding" fish?
>
> 3. More chemicals than the one identified in Section 1.2.8 (MCCP) are
> proposed for the fish bioaccumulation monitoring program in Section 1.2.8.
> It is not clear that there is evidence that the other parameters proposed
> for the fish bioaccumulation monitoring program are necessary.
>
> The bottom line is a need to understand the rationale for the proposed
> fish bioaccumulation monitoring program, which seems inconsistent with the
> findings of the ERA summarized in Section 1.2.8 of the FFS.
>
> Michael J. Kangas
> CH2M HILL
> 990 North Point Tower
> 1001 Lakeside Avenue
> Cleveland, OH 44114

ENCLOSURE 3

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276

RENEE CIPRIANO, DIRECTOR

217/782-6762

May 12, 2002

Mr. Michael Ribordy
U.S. EPA Region 5
77 West Jackson Boulevard (SR-6J)
Chicago, Illinois 60604-3590

Re: 1631215032 St. Clair County
Sauget Area 2 Site
Superfund/Technical
Administrative Order by Consent dated November 24, 2000
Focused Feasibility Study/ Groundwater Contamination Near Site R

Dear Mr. Ribordy:

The Illinois Environmental Protection Agency ("Illinois EPA") received the revised draft "Focused Feasibility Study, Interim Groundwater Remedy, Sauget Area 2 Sites O, Q, R, and S, Volumes 1 and 2" ("FFS"), for the groundwater contamination near Site R, dated March 31, 2002, and received on April 2, 2002.

Review of this document was limited to Volume 1, Sections 1, 2.7, 2.8, 3, 4, 5, and 6. My comments on these sections are listed below. Comments on Section 1 Executive Summary, are reflected in comments on subsequent sections of the document, and are intended to apply to Section 1 verbage also.

Section 2.7

The treatability study shows, under the conditions of the study, that biological treatment is feasible for groundwater associated with Site R. Under the treatment configuration and loading conditions of the study, per cent removal of certain VOCs, SVOCs, herbicides, and BOD was documented. It is not clear, based on the summary information presented on the study, whether groundwater feed stored in the equalization tank resulted in preliminary volatilization of VOCs, affecting the influent loading and elevating the per cent removal of VOCs. Further, there is no comparision of influent characteristics for the study (i.e., groundwater associated with Site R, 1992), and anticipated groundwater characteristics for the pumped discharge from the jet grout wall (i.e., groundwater quality data collected from the shallow, middle, and deep hydrogeological units in January and May 2000 were used for a data base for the local limits evaluation in Section 2.8). While the treatablity study provides supporting information, Illinois EPA does not question the treatability of the groundwater. In previous correspondence (Illinois EPA to Michael

Ribordy, February 15, 2002), Illinois EPA had asked whether the existing Sauget P Chem plant and existing public owned treatment works could treat the pumped groundwater at anticipated loading conditions in compliance with applicable regulations and permit limits. A loading evaluation would assist in this determination. Information that should be included in the loading evaluation is listed on the Attachment to this letter.

Section 2.8

Section 2.8 is a summary of a local limits evaluation. It is not possible to perform a detailed review of the local limits evaluation because a copy of the evaluation was not provided, only a summary of the evaluation. Specific comments on the summary of the local limits evaluation are listed as follows:

(a) Under Step 5 (p. 2-89), the following screening criteria should not have been used to eliminate "constituents of concern":

- constituents with maximum concentrations lower than a water quality standard (with application of mixing zone dilution factors of 80, 230, and 2,820 to 1 for acute, chronic and human health water quality standards, respectively).
- concentrations with maximum concentrations lower than the minimum inhibition criteria for heterotrophic or nitrification activated sludge.

(b) Under Step 5 [6] (p.2-89), the percent removal to prevent pass through or inhibition was calculated for each constituent the survived the screening process. It is unclear how the percent removal relates to inhibition. Inhibition is a measure of the impact of influent concentrations and loading on the treatment process. Percent removal does not prevent inhibition.

(c) Under Step 5 [6], local limits removal required (p.2-90), it is inappropriate to use the groundwater treatability study (Section 2.7) to demonstrate performance for the American Bottoms Regional Wastewater Treatment Facility, because of different treatment configurations, different loading conditions, and different influent characteristics. Illinois EPA agrees the groundwater should be amenable to biological and carbon treatment, the real question is whether American Bottoms treatment process will be inhibited by the groundwater discharge, whether American Bottoms will have pass-through, and whether the Sauget P Chem plant is appropriate treatment technology and treatment capacity to pretreat the groundwater discharge. See comment above regarding the loading evaluation.

(d) Under Step 5 [6] (p. 2-90), there is a reference to an NPDES permit renewal application submitted in October 2001 that included the proposed groundwater discharge. The NPDES permit application is a fairly voluminous submitttal. Please provide exact reference(s) as to where the proposed groundwater discharge was included in the permit application.

(e) Under Step 5 [6] (p.2-90), reference is made to a discharge permit application to be submitted to American Bottoms in April 2002. Please note, in addition to any local permitting requirements, a State Construction permit is required from Illinois EPA pursuant to 35 Ill. Adm. Code 309.202 for the new sewer and wastewater source, based on information provided. This is not an activity exempt under Section 309.202 (NPDES Permit), because the NDPES permit for American Bottoms does not contain a Construction Authorization under Section 309.154.

Section 3.0
p.3.2. The Illinois EPA does not agree that mass loading, gradient control, and reduction in fish tissue bioaccumulation are the only performance measures for the remedial action objectives. In previous correspondence (Sandra Bron to Michael Ribordy, February 15, 2002), the Illinois EPA recommended monitoring surface water and groundwater impacts, in addition to sediment toxicity monitoring. The primary remedial action objective of protecting the river, should be measurable in terms of reducing the impact of groundwater discharging to surface water to prevent surface water and sediment toxicity.

Section 3.1
p.3-3. To the extent consistent with the Scope of Work for the Interim Remedy, the Illinois EPA agrees aquifer restoration is not within the scope of the Interim Groundwater Remedy.

Section 3.3.1
p.3-4. The reference to 35 IAC 740 as a chemical-specific ARAR should be deleted. The Interim Groundwater Remedy is not part of the Voluntary Site Remediation Program.

Section 3.3.3
p. 3-6. Action-specific ARARs 35 IAC 306.302 and 309.202 are applicable, rather than relevant and appropriate, and to be considered criteria, respectively.
Please note: comments on ARARs are provided herein, and in previous correspondence (Sandra Bron to Michael Ribordy, February 15, 2002), however a formal ARARs review has not been performed.

Section 4.1.3
Same comment as Section 3.0.

Section 4.2.3.1
p. 4-7. Groundwater monitoring is proposed for VOCs, SVOCs, Herbicides, Pesticides, Metals, TOC and TDS. Evaluate the need to add dioxin and PCBs to the groundwater monitoring list, possibly on a periodic basis.

Section 5.2

p. 5-4. Under "Institutional Controls", change "...reducing adverse impacts on the Mississippi River over time" to ""...mitigating or abating the discharge of groundwater to the Mississippi River so that the impact is "insignificant" or "acceptable"".

p.5-5. Under "Physical Barrier", three partially penetrating groundwater recovery wells are proposed for installation inside the barrier wall to abate groundwater discharging to the wall. Explain why the groundwater recovery wells are partially penetrating rather than screened for the full saturated thickness of the recovery area above the bedrock. The groundwater recovery wells must be adequate number, location, and depth to recover sufficient groundwater to achieve remedial action objectives.

p. 5-6. Under "Groundwater Treatment", the groundwater extraction wells are to be connected to the sewer system through single wall thermally welded HDPE piping. Double wall piping was not considered necessary because HDPE pipe is not prone to leakage and any leakage would occur in an area of impacted groundwater. Although Illinois EPA does not argue that welded HDPE pipe is not prone to leakage, adequate QA/QC leakage (pressure) testing of the pipe upon installation, and on a regular basis following placement into operation, must be provided to verify the condition of the pipe and joints remain leak proof. The Illinois EPA does not agree that leakage is acceptable because it would be in an area of impacted groundwater, for the following reasons. First, the forcemain extends outside the barrier wall, so any leakage would not necessarily be captured by the barrier wall. Secondly, the discharge of untreated groundwater is not compliant with ARARs, even if it is to an area of impacted groundwater.

p. 5-6. Under "Groundwater Treatment", reference is made to discharge permits and a local limits evaluation. Same comments as above for Section 2.6 and Section 2.7.

p. 5-7. Under "Groundwater Quality Monitoring", same comment as above for Section 4.2.3.1.

p. 5-7. Under "Groundwater Quality Monitoring", add "For estimating purposes," to "Groundwater samples will be collected quarterly for five years and semiannually thereafter.".

p. 5-7. Under "Groundwater Quality Monitoring", the calculation of Organic Mass Loading for each hydrogeological unit, shall be determined for each organic constituent, rather than only for TOC. Similarly, the calculation of Inorganic Mass Loading for each hydrogeological unit (p.5-8), shall be determined for each inorganic constituent, rather than only for TDS. The Total Organic and Inorganic Mass Loadings would be the sums of the individual organic and inorganic constituents mass loadings for each

hydrogeological unit, respectively. These comments also apply to the final paragraph under "Groundwater Quality Monitoring", p. 5-9.

p. 5-8. Under "Groundwater Quality Monitoring", the gradient is to be determined by measuring water levels in monitor wells downgradient of Site R and a peizometer cluster on the west side of Route 3. For clarification purposes, Figure 5-1 should be amended to show the location of the piezometer cluster on the west side Route 3.

p. 5-9. Under "Groundwater Level Monitoring", electric water level recorders will be used by the pump controller to maintain pumping rates such that the water level inside the barrier wall is maintained the same as outside the wall. It is unclear how pumping rates will be controlled by water-level data at the piezometers and also by the river stage gage (Reference "Physical Barrier", p. 5-5). Will one recorder control the pumping rate in GPM, and the other control on/off operation of the pumps?

p. 5-10. Under "Bioaccumulation Monitoring", fish tissue samples are to be analyzed for SVOCs, herbicides, pesticides, metals, and percent lipids. Evaluate the need to add dioxin and PCBs to the parameter list.

Section 5.2.1
Same comment as Section 3.0.

Section 5.3
p.5-14. Under "Hydraulic Barrier", same comment as above for Section 5.2 "Physical Barrier" (p.5-5).

Section 5.3.1
p.5-17. Same comment as above for Section 3.0.

Should you have any questions or comments on the contents of this letter, please feel free to contact me at 217/557-3199.

Sincerely,

Sandra Bron

Sandra Bron, Remedial Project Manager
National Priorities List Unit
Federal Site Remediation Section
Bureau of Land

Cc: Mike Henry, IDNR
Kevin de la Bruere, USFWS
Terry Ayers, Manager, NPL Unit
Dean Studer, Bureau of Water
Landon Niedringhaus, Bureau of Water
Blaine Kinsley, Bureau of Water

Attachment
Loading Evaluation Information

(1) Krummich Plant
Existing Average, Maximum Flow Rates
Existing Average, Maximum Concentrations

(2) Interim Groundwater Remedy
Design Average, Maximum Flow Rates
Design Average, Maximum Concentrations

(3) Combine (1) and (2)
This assumes the groundwater will mix only with the Krummich plant discharge. Explain environmental benefit of pumping groundwater to the Village of Sauget trunk sewer at the Krummich plant, rather than directly to the headworks of the Sauget P Chem plant.
Calculate Average, Maximum Flow Rates
Calculate Average, Maximum Concentrations

(4) Other Flows Tributary to Sauget P Chem Plant
Existing Average, Maximum Flow Rates
Existing Average, Maximum Concentrations

(5) Influent to Sauget P Chem Plant. Combine (3) and (4)
This assumes combined groundwater and Krummich plant flows will mix with other flows tributary to the Sauget P Chem Plant.
Calculate Average, Maximum Flow Rates
Calculate Average, Maximum Concentrations
Not to exceed design flow rates, concentrations for the Sauget P Chem Plant.

(6) Effluent from the Sauget P Chem Plant
Calculate effluent concentrations based on percent removal achieved by the Sauget P Chem plant.
Calculate Average, Maximum Flow Rates
Calculate Average, Maximum Concentrations
Revise local limits as necessary. Not to exceed local limits. This assumes local limits apply at the discharge from Sauget P Chem.

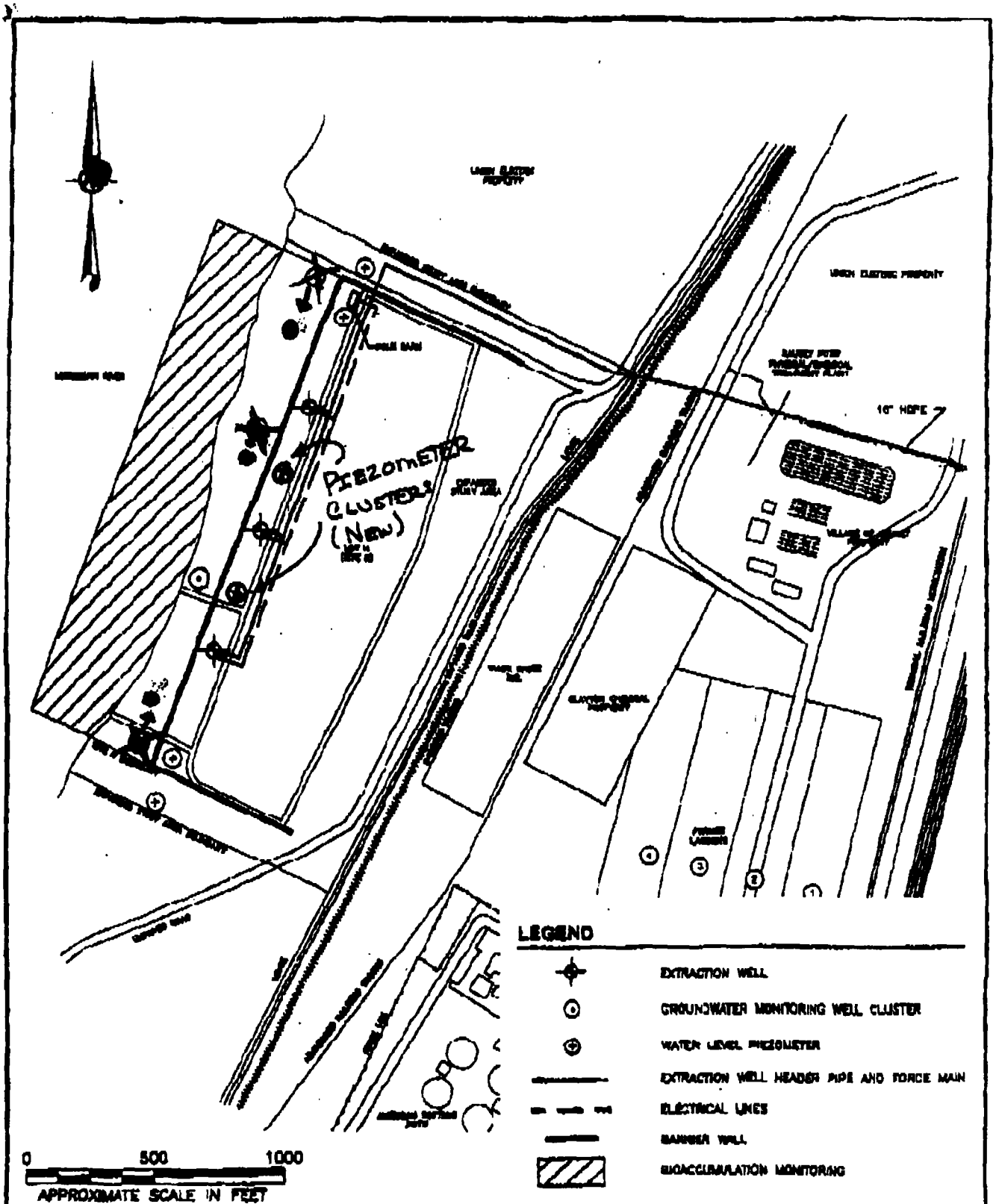
(7) Influent to the American Bottoms Primary Treatment Plant
Existing Average, Maximum Flow Rates
Existing Average, Maximum Concentrations
Revise local limits as necessary. Not to exceed local limits.

(8) Effluent from the American Bottoms Primary Treatment Plant
Calculate effluent concentrations based on percent removal achieved by Primary Treatment.
Calculate Average, Maximum Flow Rates
Calculate Average, Maximum Concentrations

(9) Combined effluents from Sauget P Chem Plant and American Bottoms Primary Treatment Plant tributary to American Bottoms Secondary Treatment Plant
Calculate Average, Maximum Flow Rates
Calculate Average, Maximum Concentrations
Not to exceed inhibition values (40 CFR 403). Not to cause violations of 35 Ill. Adm. Code 307.1101-fire, explosion, safety hazards, at the head works or within the sewer system. Not to exceed design flow rates, concentrations for the Secondary Treatment Plant.

(10) Effluent from the American Bottoms Secondary Treatment Plant
Determine the need for any change in the carbon feed rate to achieve desired percent removal. Calculate effluent concentrations based on percent removal achieved by Secondary Treatment.
Calculate Average, Maximum Flow Rates
Calculate Average, Maximum Concentrations
Not to exceed NPDES Permit limits (40 CFR 403 Pass Through) including any effluent toxicity limits.

ENCLOSURE 4



Golder Associates
St. Louis, Missouri

SCALE	AS SHOWN
DATE	03/25/02
DESIGN	JRS
CADD	MSL
CHECK	JRS
REVIEW	
FILE No.	9665.5-1
PROJECT No.	013-9665
REV.	1

TITLE: **GROUNDWATER ALTERNATIVE B PHYSICAL BARRIER**

INTERIM GROUNDWATER REMEDY
FOCUSED FEASIBILITY STUDY
Sauget Area 2, Sauget, Illinois

FIGURE 5-1

ENCLOSURE 5

RECOMMENDATIONS FOR TOXICITY MONITORING FOR THE W.G. KRUMMRICH PLANT FFS JET GROUT WALL ALTERNATIVE AND SAUGET AREA 2 SITE

Focused Feasibility Study

Based on the ecological risk assessment (ERA) for the W.G. Krummrich Plant (Menzie-Cura, 2001), sediment and/or surface water toxicity should be monitored to determine the effectiveness of the FFS Jet Grout Wall Remedial Alternative instead of the annual monitoring of fish tissue concentrations described in Section 5.2 of the FFS. Toxicity can be monitored directly using bioassay tests described in that ERA (Menzie Cura, 2001) that are most sensitive to the chemicals released from the site to sediment and overlying water. If a decision is made to monitor toxicity, a rationale based on the ERA results should be provided to explain the decision to select a specific method.

To stream-line the monitoring process, chemicals that contribute the most to sediment and water toxicity ("drivers") could be identified from the Menzie-Cura study and site-specific protective concentrations developed for those "driver" chemicals for future monitoring. These "driver" chemicals can be identified by the application of the toxic unit model or comparable method (Canfield et al., 1998; Kemble et al., 1998; USEPA, 1992) to the sediment and surface water data collected for the W.G.Krummrich Plant ERA. Sediment toxicity data may not be available for some (or many) of the key contaminants at this site. The toxic units approach for identifying driver chemicals can only be implemented if published toxicity data are available for the contaminants under consideration. It may turn out that only water toxicity data, not sediment toxicity data might be available for key contaminants. Also, the stations showing toxicity in the ERA only partially overlap between the surface water toxicity tests with Ceriodaphnia (risk at a stations 2, 3, 4, 5) and sediment toxicity tests with fathead minnow (risk at stations 3, 5, 9). If an analysis of the ERA data indicates that data are inadequate to develop site-specific protective concentrations, additional monitoring could be conducted initially to develop the data needed for this approach. These considerations indicate that a clear justification is needed for the method proposed for monitoring toxicity (toxicity tests or evaluation of chemical measurements using site-specific protective concentrations to chemical measurements) in the FFS.

The frequency at which toxicity should be monitored should be determined by using the index period approach (USEPA, 2001). This approach would involve determining the period(s) of the year when the influence of groundwater influx to the river would be the greatest based on site-specific conditions (i.e., hydrograph analysis). For instance, a sediment toxicity monitoring program has been performed in July and January for over 10 years to monitor the effectiveness of groundwater controls on a stream at a major Air Force base in the Southwest. Sampling to evaluate sediment toxicity could be performed during the winter low-flow period, and a second event conducted in a June-July time frame (Canfield et al., 1998; Kemble et al., 1998).

The locations at which monitoring is performed should reflect the locations reported in the ERA to be toxic.

In summary, the ERA for the W.G. Drummrich Plant indicated that sediment and water toxicity, not fish tissue concentration, should be addressed in monitoring the effectiveness of the jet grout wall and similar remedial alternatives in the FFS. The FFS should be revised to describe monitoring methods, frequencies and locations with appropriate rationale (which can include analysis of ERA data).

References

Canfield, T.J., E. L. Brunson, F. J. Dwyer, C. G. Ingersoll, N. E. Kemble 1998. Assessing Sediments from Upper Mississippi River Navigational Pools Using a Benthic Invertebrate Community Evaluation and the Sediment Quality Triad Approach. Arch. Environ. Contam. Toxicol. 35, 202-212.

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Menzie-Cura & Associates, Inc. (Menzie-Cura) 2001. Ecological Risk Assessment For the WG Krummrich Plant Sauget ST. Clair County, Illinois. June.

U.S. Environmental Protection Agency (USEPA) 1992. Sediment Classification Methods Compendium. Office of Water. EPA 823-R-92-006. September.

U.S. Environmental Protection Agency (USEPA) 2001. Methods for Collection Storage and Manipulation of Sediments for Chemical and Toxicological Analyses: Technical Manual. Office of Water. EPA-823-B-01-002. October.